use a solution of one part Canada balsam in from six to eight parts of turpentine oil.

It is perfectly self-evident that any other balsam soluble in turpentine oil, *i. e.*, turpentine, or a resin soluble in it, will answer the same purpose. Any other volatile oil can also be substituted for turpentine oil.

A DISEASE OF WHITE FIR.*

By Dr. HARTIG.

A disease of the white fir, which caused very great injuries in the Bavarian woods, was discovered by the author, and shows itself in the dying of the bark of younger or older twigs and branches, often for over a hand's length. As a rule, the dying extends over the entire circumference of the twig, and in consequence the parts of the plants situated above this point die in a few years. More rarely the disease is confined to one side of the twig, and does not progress the second year, but an outgrowth occurs at the edge of the dead place. In the dead bark there develop numerous pycnidia, rarely larger than the head of a pin, which rupture the superimposed cork layer. Within the pycnidia arise numerous small, spindle shaped gonidia, which germinate readily. Unfortunately, an acigerous fruiting form has not been found after several years of observations and cultures. To be sure *Peziza calycina* almost constantly produced a luxuriant formation of Apothecia in the immediate neighborhood, yet the absolute proof of its connection with the pycnidial form was impossible. Until it can be perfectly known the author has given this fungus the name *Phoma abietina, n. sp.*

NOTES.

By B. T. GALLOWAY.

PREVENTION OF SMUT.

In the first number of THE JOURNAL† we gave a brief review of a paper published in the *Journal of the Royal Agricultural Society* of England by J. L Jensen on "The Propagation and Prevention of Smut in Oats and Barley." The interest shown in this paper has prompted us to publish a description of Mr. Jensen's method of treating the grain, and it is hoped that the suggestions made will enable the experiment stations to test the remedy. Mr. Jensen says:

> We have seen that smut can be prevented by dipping the grain in heated water. * * * The grain to be dipped is placed in a shallow cylindrical basket about 12 inches deep, lined with coarse canvas, and provided with a cover made by stretching the canvas over a ring of such a diameter as will pass inside the mouth of the basket.

---

* Translated from *Botanisches Centralblatt* No. 3, p. 78, 1889, by E. A. Southworth.

† Page 42.

The canvas should overlap the ring by about an inch all round. An ordinary boiler, such as is found on every farm, is filled with water and heated to the boiling point.

Two vessels of sufficient size are placed near it. These may be designated 1 and 2. Supposing the boiler to contain 35 gallons of boiling water, if 12½ gallons of cold and the same quantity of boiling water be put into each vessel, we shall have 25 gallons of water at 132° F., in both of them. The exact temperature may be readily obtained by adding a little more hot or cold water, as the thermometer shows to be required.

A basket containing three-quarters of a bushel of grain, which must not be more than 8 inches in depth, is now dipped into No. 1 four times; this will take rather more than half a minute, and will reduce the temperature of the water 8 or 9 degrees. It is now to be rapidly dipped five or six times into No. 2, which will take about one minute, and then dip once per minute for three minutes longer, *i. e.*, five minutes altogether in the two vessels This will reduce the temperature of the water in No. 2 from 132° to 129° to 130°. If steeped barley be used the original temperature of the vessels should be 129° to 130°; but with unsteeped grain, for oats, wheat or rye, it does not matter if the original temperature be 133° to 136°.

The seed must now be cooled. This is best done by placing the basket on the top of a third vessel and pouring a couple of buckets of cold water upon the grain in it, taking care that the cold water falls not only upon the center, but round the edges, so that the corn may be uniformly cooled. The basket is now emptied on the floor and the seed spread out in a thin layer, so that it may cool completely. The water used in cooling the grain will have its temperature raised and may be employed in replenishing the boiler. The requisite temperature (132° F.) of vessels Nos. 1 and 2 must be maintained throughout the process by adding from time to time boiling water from the boiler and transferring from them a similar amount back again to the boiler. The temperature must be regulated by a thermometer, which when used must be plunged deeply into the water.

The basket must be completely immersed each time, then lifted quite out of the water so as to allow it to drain for four or five seconds before it is dipped again.

The above process in practice will be found simple and easy enough to perform, although its description is necessarily somewhat complicated.

REVIEWS OF RECENT LITERATURE.

ARTHUR, J. C. *Smut of Wheat and Oats.* Bulletin of the Agricultural Experiment Station of Indiana, No. 28, September, 1889.

While containing little or nothing new, this little bulletin is full of practical matter and will be an invaluable aid to those whose crops are attacked by these diseases.

Most of the bulletin is taken up with *Tilletia fœtens*, or "stinking smut," as Professor Arthur calls it, to distinguish it from black smut.

The fungus is described, and some space is devoted to early opinions as to the origin of smut. In the discussion of the name the author says that the name *Tilletia lævis* should be changed to *T. fœtens*, Rav., since Ravenel was the first to describe and name it.

Under the heading "attack and spread of the disease" the following questions are proposed and answered: "Will the smut spread from field to field while the crop is growing, as rust does? Will there be any danger of introducing it on one's farm by sowing seed wheat from a farm known to be smutted? Can the disease be introduced by the ap-